Rheumatic Heart Disease in Pregnancy

Australasian Maternity Outcomes Surveillance System Study

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Background

- Prevalence of Rheumatic Heart Disease in Pregnancy (RHD-P) unknown in Australia and New Zealand
- Pregnant women under-researched
- Two countries – clustering among Aboriginal, Maori and Pacifica women
- Largely remote settings in Australia and urban settings in New Zealand
- Common theme social disadvantage / poverty
- First national study of RHD-P
Objectives – Australia & New Zealand

- Prevalence and distribution of RHD-P
- How do model(s) of care for RHD-P vary by severity of disease, place(s) of residence & health service delivery?
- How does the severity of RHD-P impact on maternal & fetal outcomes?
- Diagnosis during pregnancy associated with increased maternal and fetal complications?
RHD-P case inclusion criteria

• Pregnant and confirmed ongoing Rheumatic Heart Disease (RHD)* on latest echo (investigator review of reports)

• Pregnant + historic echo diagnosis of definite RHD* where recent echo details are not available

Study design
- Population based, observational
- Australia & New Zealand 2013-2014
- Maternity units 50 births per year = 300 sites
- Monthly negative surveillance
- Cases reported by AMOSS site coordinators
AMOSS RHD web-based survey

- General medical & cardiac / obstetric history
- Clinical pathway through pregnancy/postpartum
- Perinatal outcomes
- Diagnosis and management of RF/RHD

Surveillance RHD-P, Australia and New Zealand 2013-2014

Total cases notified n=596

- No data received n=2
- Delivered outside study period n=32 (x%)

Presumptive cases n=580

- Did not meet case definition n=273(xx%)

- Excluded n= 14
  - Duplicates n=8;
  - Transferred before birth n=6

- Did not meet inclusion criteria n=146
- No evidence of RF/RHD n=95

Confirmed cases
Rheumatic heart disease n= 307
## Results RHD-P

<table>
<thead>
<tr>
<th>Population</th>
<th>Number</th>
<th>Prevalence / 10,000 women giving birth</th>
<th>95% CIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia and New Zealand</td>
<td>307*</td>
<td>4.3</td>
<td>3.8, 4.7</td>
</tr>
<tr>
<td>Aboriginal women</td>
<td>149</td>
<td>62.0</td>
<td>52.0, 71.9</td>
</tr>
<tr>
<td>Maori</td>
<td>68</td>
<td>25.5</td>
<td>19.5, 31.6</td>
</tr>
<tr>
<td>Pacifica</td>
<td>39</td>
<td>33.0</td>
<td>22.6, 43.3</td>
</tr>
</tbody>
</table>

* 285 women with 307 births 2013-2014

Preliminary data
# Sociodemographic characteristics RHD-P

<table>
<thead>
<tr>
<th>Characteristics (n=307)</th>
<th>Women with RHD %</th>
<th>Australia women giving births* %</th>
<th>Indigenous women</th>
<th>All women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age years</td>
<td>27.3</td>
<td>25.3</td>
<td>30.1</td>
<td></td>
</tr>
<tr>
<td>Parity - 0</td>
<td>31.9</td>
<td>n.a</td>
<td>43.6</td>
<td></td>
</tr>
<tr>
<td>Parity - 1-2</td>
<td>38.4</td>
<td>n.a</td>
<td>47.7</td>
<td></td>
</tr>
<tr>
<td>Parity - 3+</td>
<td>28.3</td>
<td>n.a</td>
<td>8.3</td>
<td></td>
</tr>
<tr>
<td>Smoking during pregnancy</td>
<td>51.8</td>
<td>48</td>
<td>11.7</td>
<td></td>
</tr>
<tr>
<td>BMI - &lt;18.5</td>
<td>5.2</td>
<td>n.a</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>BMI - 18.5-24.9</td>
<td>30.0</td>
<td>n.a</td>
<td>49.7</td>
<td></td>
</tr>
<tr>
<td>BMI - 25.0-29.9</td>
<td>23.5</td>
<td>n.a</td>
<td>26.3</td>
<td></td>
</tr>
<tr>
<td>BMI - 30.0+</td>
<td>37.4</td>
<td>n.a</td>
<td>20.3</td>
<td></td>
</tr>
<tr>
<td>&gt;1 pregnancy during study n=22</td>
<td>7.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where women with RHD-P live compared to where they gave birth
Antenatal management

- 37.5% ≥1 antenatal visit in the 1st trimester (< 14/40)
- 36.2% 1st antenatal visit after 20 weeks gestation
- 41.7% transferred care during pregnancy
- 27.4% admitted for higher care (HDU) antepartum

Cardiac assessment and care

- 14.0% attended ≥ 1 cardiac care visit in the 1st trimester
- 41.0% did not begin cardiac care until >20 weeks gestation
- 14.3% (n=33/307) did not have an echo during the pregnancy
Timing of diagnosis of RHD-P

- Pre-pregnancy: 87.9%
- During pregnancy: 9.8%
- Postpartum: 4.9%
- Unknown: 2.3%
RHD-P and co-morbidities

• 31.6% aortic/mitral stenosis presented at booking visit
• 16.6% (51/307) had history of cardiac valvular surgery or balloon valvuloplasty (PBVM (15), MV repair (14), MV replacement (6), AV repair (6))

• Obstetric conditions and complications

  • 13.4% gestational diabetes
  • 6.8% gestational hypertension or preeclampsia
  • 5.9% antepartum haemorrhage
  • 1.6% thromboembolism
## Labour & birth for women RHD-P

<table>
<thead>
<tr>
<th></th>
<th>Women with RHD (%)</th>
<th>All Australia women giving births* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Did the woman labour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81.1</td>
<td>81.3</td>
</tr>
<tr>
<td>Spontaneous</td>
<td>48.5</td>
<td>52.7</td>
</tr>
<tr>
<td>Induced</td>
<td>32.2</td>
<td>27.6</td>
</tr>
<tr>
<td>No</td>
<td>18.9</td>
<td>19.7</td>
</tr>
<tr>
<td><strong>Method of birth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unassisted vaginal birth</td>
<td>60.9</td>
<td>54.8</td>
</tr>
<tr>
<td>Instrumental birth</td>
<td>10.1</td>
<td>12.4</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>28.7</td>
<td>32.8</td>
</tr>
<tr>
<td>Labour</td>
<td>9.8</td>
<td>13.1</td>
</tr>
<tr>
<td>No labour</td>
<td>18.9</td>
<td>19.7</td>
</tr>
</tbody>
</table>

RHD-P Maternal outcomes

• 10.1% post-partum haemorrhage (1000+ ml)

• 18.6% admitted to HDU/ICU/CCU postpartum

• Average length of stay in hospital 6.4 (±8.0) days

• One maternal death (with multiple co-morbidities), case fatality 0.34%

• Women on anticoagulants (n=30) increased risk of stillbirth (n=3) - (10% vs 2.2%)
Perinatal outcomes

• 310 babies born to 307 women with RHD-P
  • 303 live-born (2 neonatal deaths)
  • 7 stillbirths

• Stillbirth rate 22.8 /1000 births
  • 11.2/1000 births to Indigenous mothers
  • 7.0/1000 births to all mothers in Australia

• Birth defects 35.4 per 1000 births (n=11)
  • One lethal (VSD - neonatal death)/ no stillbirths
  • Four due to congenital heart disease
Cardiac disease severity and poorer perinatal outcomes

- NYHA: 1/7 women with a stillbirth developed NYHA III during pregnancy. (unplanned, unknown pregnancy, taking anticoagulation, APH. Fetal demise 20/40)
- 5/9 mothers with a perinatal death had MS during index pregnancy (from echo reports) vs 1/3 of women with MS overall in study
- 5/11 mothers with baby with congenital birth defect(s) had MS during index pregnancy (from echo reports).
Distribution of gestational age

Per cent

RHD
Australia norm*

Gestational age (weeks)

# Neonatal outcomes of 303 babies

<table>
<thead>
<tr>
<th></th>
<th>Babies (n=310) born to women with RHD-P %</th>
<th>All babies in Australia*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Babies of Indigenous women %</td>
<td>All births %</td>
</tr>
<tr>
<td>Mean gestational age</td>
<td><strong>37.6 weeks</strong></td>
<td><strong>38.7 weeks</strong></td>
</tr>
<tr>
<td>Preterm (&lt;37 weeks)</td>
<td>*20.2</td>
<td>14</td>
</tr>
<tr>
<td>Birthweight (grams)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1500</td>
<td>6.5</td>
<td>2.1</td>
</tr>
<tr>
<td>&lt;2500</td>
<td>*18.9</td>
<td>12.2</td>
</tr>
<tr>
<td>Small for gestational age</td>
<td>15.6</td>
<td>n.a</td>
</tr>
<tr>
<td>Large for gestational age</td>
<td>10.1</td>
<td>n.a</td>
</tr>
<tr>
<td>Apgar at 5 minutes &lt;7</td>
<td>*4.9</td>
<td>3</td>
</tr>
<tr>
<td>Admission to NICU/SCU</td>
<td>*31.9</td>
<td>24</td>
</tr>
<tr>
<td>Neonatal deaths / 1,000 live births</td>
<td>6.7</td>
<td>7</td>
</tr>
</tbody>
</table>

*Increased risk with remoteness

Conclusion

- High income countries - RHD-P found overwhelmingly among Indigenous peoples
- Differential access to cardiac care – 10% de novo diagnosis – importance of echos
- Late uptake /access to antenatal care
- High rates of transfer of care
- Increased risk of severe maternal morbidity/mortality
Conclusion

- Increased rate stillbirth, preterm birth, small for gestational age and their sequelae
- Excess burden of perinatal morbidity and mortality above baseline of relative disadvantage
- Pregnancy - opportunistic for diagnosis/monitoring
- Role of screening in high risk groups/clusters
Conclusion

- Need for integrated care – careful monitoring and multidisciplinary care during pregnancy in conjunction with preconception counseling and pregnancy planning
- Adoption of chronic disease model(s) of care
- Findings consistent with other studies – persistent relative disadvantage – in both maternal and baby outcomes with RHD-P marker of inequity, inequality, poverty and social disadvantage
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RHD Investigators & Reference Group

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